**Genetics Practice Problems**

1.  For each genotype below, indicate whether it is heterozygous **(He)** or homozygous **(Ho)**

|  |  |  |  |
| --- | --- | --- | --- |
| AA \_\_\_\_\_ | Ee \_\_\_\_ | Ii \_\_\_\_\_ | Mm \_\_\_\_\_ |
| Bb \_\_\_\_\_ | ff \_\_\_\_ | Jj \_\_\_\_\_ | nn \_\_\_\_\_ |
| Cc \_\_\_\_\_ | Gg \_\_\_\_ | kk \_\_\_\_\_ | oo \_\_\_\_\_ |
| DD \_\_\_\_\_ | HH \_\_\_\_ | LL \_\_\_\_\_ | Pp \_\_\_\_\_ |

2.  For each of the **genotypes** below determine what **phenotypes** would be possible.

|  |  |
| --- | --- |
| *Purple flowers are dominant to white flowers.*  PP \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Pp \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  pp \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *Round seeds are dominant to wrinkled seeds.*  RR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Rr \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  rr \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | *Brown eyes are dominant to blue eyes*  BB \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Bb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  bb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *Bobtails in cats are recessive.*  TT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Tt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  tt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|
|
|

3.  For each **phenotype** below, list the **genotypes** (remember to use the letter of the dominant trait)

|  |  |
| --- | --- |
| *Straight hair is dominant to curly.*  \_\_\_\_ straight  \_\_\_\_ straight  \_\_\_\_ curly | *Pointed heads are dominant to round heads.*  \_\_\_\_\_ pointed  \_\_\_\_\_ pointed  \_\_\_\_\_ round |

4. Set up the Punnet squares for each of the crosses listed below. *Round seeds are dominant to wrinkled seeds.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rr x rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| RR x rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| RR x Rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Rr x Rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Practice with Crosses.  Show all work!**

5.  A TT (tall) plant is crossed with a tt (short plant).

What percentage of the offspring will be tall?  \_\_\_\_\_\_\_\_\_\_\_

6.  A Tt plant is crossed with a Tt plant.

What percentage of the offspring will be short?  \_\_\_\_\_\_

7.  A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR).

What percentage of the offspring will be homozygous (RR)?  \_\_\_\_\_\_\_\_\_\_

8.  A homozygous round seeded plant is crossed with a homozygous wrinkled seeded plant.

What are the genotypes of the parents?  \_\_\_\_\_\_\_\_\_\_   x  \_\_\_\_\_\_\_\_\_\_

What percentage of the offspring will also be homozygous?  \_\_\_\_\_\_\_\_\_\_\_

9.  **In pea plants purple flowers are dominant to white flowers**.

If two white flowered plants are cross, what percentage of their offspring will be white flowered?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_

10.  A white flowered plant is crossed with a plant that is heterozygous for the trait.

What percentage of the offspring will have purple flowers?\_\_\_\_\_\_\_\_\_\_\_

11.  Two plants, both heterozygous for the gene that controls flower color are crossed.

What percentage of their offspring will have purple flowers?  \_\_\_\_\_\_\_\_\_\_\_\_

What percentage will have white flowers?  \_\_\_\_\_\_\_\_\_\_\_

12.  In guinea pigs, the **allele for short hair is dominant**.

What genotype would a heterozygous short haired guinea pig have?  \_\_\_\_\_\_\_

What genotype would a purebreeding short haired guinea pig have?  \_\_\_\_\_\_\_

What genotype would a long haired guinea pig have? \_\_\_\_\_\_\_\_

13.  Show the cross for a pure breeding short haired guinea pig and a long haired guinea pig.

What percentage of the offspring will have short hair?  \_\_\_\_\_\_\_\_\_\_

14. Show the cross for two heterozygous guinea pigs.

What percentage of the offspring will have short hair?  \_\_\_\_\_\_\_\_

What percentage of the offspring will have long hair?  \_\_\_\_\_\_\_